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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/631,623	08/04/2000	Yukihiro Nagai	50090-233	2307

7590 03/27/2003

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EXAMINER

KANG, DONGHEE

ART UNIT

PAPER NUMBER

2811

DATE MAILED: 03/27/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/631,623

Applicant(s)

YUKIHIRO NAGAI

Examiner

Donghee Kang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 December 2002 :
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4, 6 and 7 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 6 is/are rejected.
- 7) ☒ Claim(s) 7 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 7.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Acknowledgment

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1. Applicant's Amendment and Response to Paper No.9 has been entered and made of Record.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-4 & 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bracchitta et al. (US 6,130,469) in view of Tsutomu (JP 01-295440).

Regarding claim 1, Bracchitta et al. teach a semiconductor device comprising (Fig.4):

a semiconductor substrate (30); a first portion comprising a plurality of active regions formed in the semiconductor substrate; a second portion comprising at least one trench having an interior surface formed by side surface and a bottom surface; a surface insulating film formed on a surface of the active regions in the first portion and on the side surfaces lining the interior surface of said at least one trench in the second portion; and a conductive film formed on the surface insulating film, wherein the surface insulating film is sufficiently thin to function as an electric fuse.

Bracchitta does not explicitly teach a plurality of isolation regions separating the active regions. However, it is conventional in the art to form isolation regions in an

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active area associated with microelectronic device on a semiconductor substrate.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the isolation regions in VLSI ICs, since the isolation regions allow microelectronic devices to be placed increasingly closer to each other without causing detrimental electronic interaction such as unwanted capacitance build-up and cross-talk.

Bracchitta do not teach the insulating layer lining the bottom of the trench to function as an electric fuse. However, Tsutomu in Fig.2f teaches the insulating film 2 lining the interior surface of the groove and sufficiently thin to function as an electric fuse. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the thin insulating layer in Bracchitta's device, since thin insulating layer is required a minimum voltage to function as an electric fuse.

Regarding claim 2, Bracchitta teaches the semiconductor device further comprising:

a plurality of surface insulating film formed on a surface of the active regions in the first portion; and a plurality of conductive films formed on each of the insulating films in the first portion, wherein one of the surface insulating films is formed on the interior surface of said at least one trench in the second portion and is capable of functions as an electric fuse.

Regarding claim 3, Bracchitta teaches the plurality of surface insulating films are gate oxide films; and the plurality of conductivity films are gate electrodes.

Regarding claim 4, Bracchitta teaches a semiconductor device comprising (Fig.4):

a semiconductor substrate (30); at least a trench, having an interior surface formed by side surface and a bottom surface, formed in the semiconductor substrate; a surface insulating film formed along the side surface and bottom surface of the trench of the semiconductor substrate; and a conductive film (40) formed on the surface insulating film; wherein the surface insulating film.

Bracchitta do not teach the insulating layer lining the bottom of the trench to function as an electric fuse. However, Tsutomu in Fig.2f teaches the insulating film 2 lining the interior surface of the groove and sufficiently thin to function as an electric fuse. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the thin insulating layer in Bracchitta's device, since thin insulating layer is required a minimum voltage to function as an electric fuse.

Regarding claim 6, Bracchitta does not teach pluralities of trenches are formed adjacently, and a surface insulating film and a conductive film are formed in each trench. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the plurality of trenches and a surface insulating film and a conductive film are formed in each trench, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8.

Allowable Subject Matter

4. Claim 7 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

5. Applicant's arguments with respect to claims 1-4 & 6 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

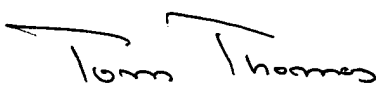
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Donghee Kang whose telephone number is 703-305-9147. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 703-308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

dhk
March 19, 2003


TOM THOMAS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800